LISITSIAN, N.; SHVARTS, G.

"Studies on Soviet credit" by IU.E. Shenger. Reviewed by N. Lisitsiam, G. Shvarts. Vop. ekon. no.9:119-123 S '62. (MIRA 15:9)

(Credit) (Shenger, IU.E.)

SHVARTS, Grigoriy Aronovich; PARFAN'YAK, P.A., prof., otv. red.; NADEZHDINA, A., red.izd-va; TELEGINA, T., tekhn. red.

[Non-cash payments and credit in the U.S.S.R.] Beznalichnyi oborot i kredit v SSSR. Moskva, Gosfinizdat, 1963. 218 p. (MIRA 16:8)
(Clearing house) (Credit)

SKVARTS, G.A.

Dereviye I Lyukovoy Koksovykh Mechey (Doors and Hatches of Coke Stoves) Khar'kov, Metallurgizdat, 1953. 155 P. Diagrs., Tables.

SO: N/5
741 .A71
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SHVARTS, G. A.

G. A. Shvarts, Dverevoy i lyukovoy koksovykh pechey/Coke-Ovens with Doors and with Manholes/, Metallurgizdat, 8 sheets.

Describes a complete scheme of a modern chemical coking plant, the design of Soviet-system coke-ovens, the over-heat control elements, the design of the machines and mechanisms, the processes of quenching and coke sorting. The operation of the coke-ovens and stakhanovite methods of work are discussed in detail.

The book is intended for the door and the manhole coke-ovens studied in the technical production courses; it may be useful to workers of other skills in a coking shop.

SO: U-6472, 12 Nov 1954

SHVARTS, G.A.

Charging coke ovens. Koks i khim. no.2:32-37 '55. (MLRA 9:3)

1. Zaporazhskiy koksokhimicheskiy zavod.
(Coke ovens)

SHVARTS, G.A.

Coking unit of the Zaporozh'ye Coke Chemical Plant. Koks i khim. no.4:28-32 '56. (MLRA 9:9)

1.Zaporozhskiy koksokhimicheskiy zavod.
(Zaporozh'ye--Coke industry--Equipment and supply)

EYDEL'SHTEYN, Ya.M.; KULESHOV, P.Ya.; SHVARTS, G.A.; MUSTAFIN, F.A.

Comments on R.Z.Lerner's article "Changing the layout of a coking section for considerable increase in the number of ovens per battery. Koks i khim.no.6:32-36 '56. (MLRA 9:10)

1.Koksokhimmontazh (for Eydel'shteyn).2.Zaporozhskiy koksokhimicheskiy zavod (for Kuleshov and Shvarts).3.N.-Tagil'skiy koksokhimicheskiy zavod (for Mustafin).

(Coke ovens)

68-9-12/15

AUTHORS: Kuleshov, P.Ya. and Shvarts, G.A.

TITLE: A Method of Comparing the Productivity of Labour in Coke Oven Departments of Various Coke Oven Works (Metod sravneniya proizvoditel'nosti truda rabochikh koksovykh tsekhov na razlichnykh koksokhimicheskikh zavodakh)

PERIODICAL: Koks i Khimiya, 1957, Nr 9, pp.55-59 (USSR)

ABSTRACT: The above problem is discussed and the following formula for calculating the productivity of labour in coke ovens is proposed: $P = \frac{V \cdot K}{Q}$ where: V - useful volume of a standard battery (V = volume of one oven x number of ovens serviced by one team), K - coefficient of utilisation of the working volume of one oven in tons of dry coke per 1 m^3 of its useful volume, Q - number of labourers per 1 standard battery. It is pointed out, in an editorial note, that some of the author's statements are disputable and therefore further discussion on the subject is invited. There are 3 tables.

ASSOCIATION: Zaporozh'ye Coke Oven Works (Zaporozhskiy Koksokhimicheskiy Zavod)

AVAILABLE: Library of Congress.

Card 1/1

AUTHOR: Shvarts, G.A. 68-58-5-5/25

TITLE: From Practice of Operating Mechanised and Automatised Equipment on Coke Ovens (Praktika ekspluatatsii ustroystv po mekhanizatsii i avtomatizatsii v koksovom tsekhe)

PERIODICAL: Koks i Khimiya, 1958, Nr 5, pp 18 - 23 (USSR)

ABSTRACT: During the last 3-4 years, some industrial processes of the above works were mechanised or automatised (described in Koks i Khimiya, 1955, Nr 2, and 1956, Nr 4). In the present paper, the difficulties encountered in the operation of this equipment and improvements made are described and illustrated. The operation of the following equipment is discussed; automatic weighing of coal charge; automatically-operated vibrator in the larry car (Fig.1); door lining (Fig.2); mechanical cleaning of door frames (Fig.3); mechanical cleaning of doors (Fig.4); control of pusher operator of spillage bunker (Fig.5); automatic lifting of levelling door (Fig.6); automatic discharge of coke from wharf onto the conveyor belt and conveyor belt sweeper (Fig.7). There are 7 figures.

ASSOCIATION: Zaporozhskiy koksokhimicheskiy zavod (Zaporozh'ye Coke Oven Works)

Card 1/1

SHVARTS, G. A.

PHASE I BOOK EXPLOITATION SOV/4672

Ispol'zovaniye reservov mashinostroitel'nogo proizvodstva; iz opyta peredovykh zavodov (Utilization of Reserves in the Machine Building Industry; Practices of Leading Plants) [Leningrad] Lenizdat, 1959. 238 p. 3,000 copies printed.

General Ed.: A.M. Kucher, Candidate of Technical Sciences; Ed.: M.S. Chervova. Tech. Ed.: I.M. Tikhonova.

PURPOSE: This collection of articles is intended for workmen and technical personnel of the machine-building industry.

COVERAGE: The book examines principal trends in the utilization of unused production capacity of machine building plants and indicates ways to realize these reserves. On the basis of examples drawn from the practice of the leading plants of the Lensovnarkhoz, the authors show how to utilize this unused capacity by applying the following measures: improvement of the processability of constructions; bringing the shapes and sizes of blanks closer to the shapes and sizes of finished parts; replacement of mechanical machining with cold stamping; improvement of the efficiency of existing technological processes and introduction of new ones; and a comprehensive mechanization and automation of the equipment. The problem of utilizing unused capacity in the construction of heavy machinery is dealt with separately. No personalities are mentioned. There are no references.

Vayntraub, D.A., and G.A. Shvarts. Replacing Mechanical Machining With Cold Stamping 104

Raykhenshteyn, I.Ye. Reduction of Cycle Time in Mechanical Machining 124

Zazeretskiy, Ye.I. Practices of the Stankostroitel'nyy zavod im. Sverdlova (Machine-Tool Plant imeni Sverdlov) in Reducing Expenditure of Set-Up Time 145

Zapol'skikh, M.Z. Efficiency Improvements and Inventions as Important Factors of Unused Capacity 171

Slyusar', V.I. Advanced Technological Processes 182

Bets, V.G. Practices of the Kirovskiy Zavod (Kirov Plant) for Modernizing Equipment 199

Dolinskiy, E.D. Unused Production Capacity in Heavy Machinery Constructions 233

AVAILABLE: Library of Congress (TJ1160.K8)

SOV/68-59-4-6/23

AUTHOR: Shvarts, G.A.

TITLE: On the Way to a Complex Mechanisation of Coke Production (Na puti k kompleksnoy mekhanizatsii koksovogo proizvodstva)

PERIODICAL: Koks i Khimiya, 1959, Nr 4, pp 16-19 (USSR)

ABSTRACT: Main changes in the mechanisation and automation of some work carried out on the coke ovens of the Zaporozh'ye Works are briefly outlined. The following points are mentioned: 1) vibrators on service bunkers and automation of charging larry cars from service bunkers; 2) automation of charging ovens and levelling of the charge - the duration of charging 2.5 to 3 min - this permitted servicing of two batteries with one larry car; 3) mechanisation of cleaning the bend in the ascension pipes. At present self sealing lids for ascension pipes (fig 2) and charging holes (fig 3) are being introduced. All the above measures considerably facilitated the work of operators. The present output per man on coke ovens increased to 20.6 tons of coke.

Card 1/2

SOV/68-59-4-6/23

On the Way to a Complex Mechanisation of Coke Production

The mechanism used for the mechanisation of opening lids of charging holes is shown in Fig 1. There are 3 figures.

ASSOCIATION: Zaporozhskiy Koksokhimicheskiy Zavod (Zaporozh'ye Coking Works)

Card 2/2

SHVARTS, Gersh Ayzikovich; MAYZLIN, Boris Savel'yevich; LERNER, B.Z., red.; GOLYATKINA, A.G., red.izd-va; ISLENT'YEVA, P.G., tekhn. red.

[Automation and mechanization in coke shops] Avtomatizatsiia i mekhanizatsiia v koksovykh tsekhakh. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 191 p. (MIRA 14:12)

(Coke industry--Equipment and supplies) (Automation)

SHVARTS, G.A.

Personnel of coke plants. Koks i khim. no.4:32-36 '61.
(MIRA 14:3)

1. Zaporozhskiy koksokhimicheskiy zavod.
(Coke industry)

SHVARTS, G.A.

Experience in the operation of coke ovens without the presence of workers for servicing charging hole lids, oven doors and gas collecting mains. Koks i khim. no.9:54-56 '62. (MIRA 16:10)

1. Zaporozhskiy koksokhimicheskiy zavod.
(Coke ovens) (Automation)

SHVARTS, G.A.

Economic advantages of mechanization and automation in the coking plants. Koks i khim. no.5:54-56 '63. (MIRA 16:5)
(Coke plants--Equipment and supplies) (Automation)

SHVARTS, G.A.

Weighing and volumetric method for the loading of coke ovens.
Koks i khim. no.3:29-31 '64. (MIRA 17:4)

TAYTS, Ye.M., doktor tekhn. nauk; SHVARTS, S.A., kand. tekhn. nauk[deceased]; PEYSAKHZON, I.B., inzh.; GEL'FER, M.L., inzh.; DMITRIYENKO, M.T., inzh.; DORFMAN, G.A., inzh.; IZRAELIT, Ye.M., inzh.; KULAKOV, N.K., inzh.; KUSHLYANSKIY, B.S., inzh.; MEYKSON, L.V., inzh.[deceased]; LEONOV, A.S., inzh.; SHVARTS, G.A., inzh.; SHVARTSMAN, I.Ya., inzh.; YATSENKO, N.Ya., inzh.; BABIN, P.P., inzh.; KHANIN, I.M., doktor tekhn. nauk, prof., red.; KOZYREV, V.P., inzh., red., KUPERMAN, P.I., inzh., red.; LGALOV, K.I., inzh., red.; LEYTES, V.A., inzh., red.; LERNER, B.Z., inzh.,red.; POTAPOV, A.G., inzh., red.; SHELKOV, A.K., red.

[By-product coke industry worker's handbook in six volumes] Spravochnik koksokhimika v shesti tomakh. Moskva, Metallurgiia, Vol.2. 1965. 288 p. (MIRA 18:8)

KATSNEL'SON, S.M., inzh.; SHVARTS, G.K., inzh.

Methods for automatic voltage control of self-regulated autonomous ionic frequency converters. Elektrichestvo no.11:71-76 N '62. (MIRA 15:11)

(Frequency changers) (Electric current converters)

MEL'NIK, Anatoliy Arsent'yevich; SHVARTS, G.L., red.; IZRAILEVA, G.A., red.izd-va; BYKOVA, V.V., tekhn.red.

[Using helicopters in geological surveying] Vertolet na sluzhbe geologii i drugikh otraslei narodnogo khoziaistva. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po geol. i okhrane nedr, 1960. 81 p. (MIRA 13:9)

(Aeronautics in geology)

SYRMAY, A.G., nauchnyy sotr.; OBERMEYSTER, A.M., nauchnyy sotr.; BRONFMAN, A.I., nauchnyy sotr.; SHIMKO, K.N., kand. tekhn. nauk; PARAKHONSKIY, B.M., kand. ekon. nauk. Prinimali uchastiye: ZHURILOV, V.I., nauchnyy sotr.; ZUBKOV, M.I., nauchnyy sotr.; SHVARTS, G.L., nauchnyy sotr.; MIKHEYEV, A.P., doktor tekhn. nauk, prof., otv. red.; BYKOV, I.K., red. izd-va; DOROKHINA, I., tekhn. red.

[Water and air transportation in capitalist countries: trends in the development of equipment] Vodnyi i vozdushnyi transport kapitalisticheskikh stran; tendentsii razvitiia tekhnicheskikh sredstv. Moskva, Izd-vo Akad.nauk SSSR, 1961. 350 p. (MIRA 15:1)

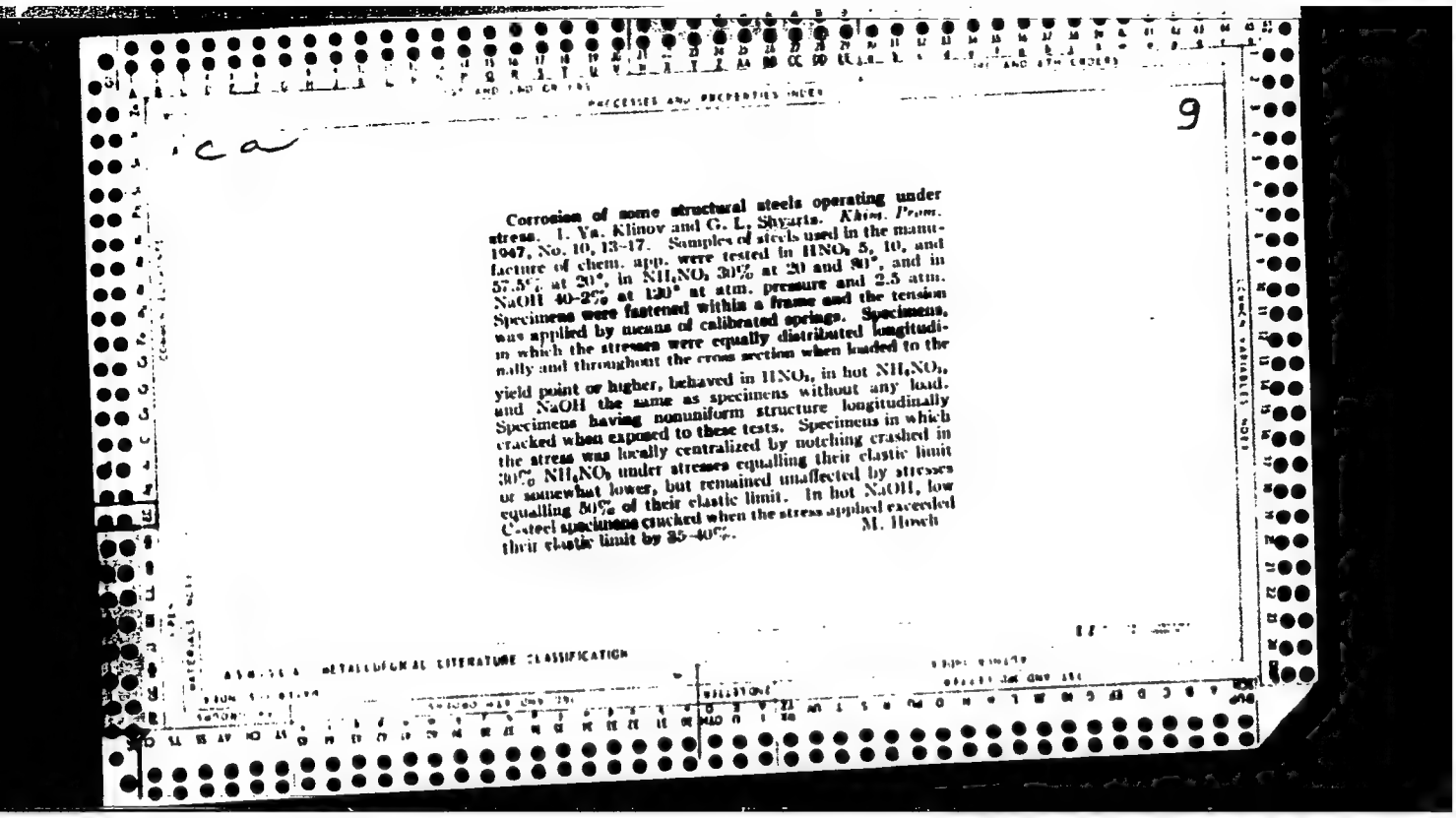
1. Akademiya nauk SSSR. Institut kompleksnykh transportnykh problem.

(Merchant marine) (Aeronautics, Commercial)

[redacted], V. I. [redacted] Cand. Tech. Sci.

Dissertation: "Investigation of the Corrosion of Statically Loaded Carbon Steels in Certain Corrosive Media," Moscow Inst of Chemical Machine Building, 29 May 47.

SO: Vecherniaya Moskva, May, 1947 (Project #17836)



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Corrosion of some structural steels operating under stress. I. Ya. Klinov and G. L. Shyarts. *Khim. Prom.* 1947, No. 10, 13–17. Samples of steels used in the manufacture of chem. app. were tested in HNO_3 5, 10, and 57.5% at 20°, in NH_4NO_3 30% at 20 and 80°, and in NaOH 40–2% at 120° at atm. pressure and 2.5 atm. Specimens were fastened within a frame and the tension was applied by means of calibrated springs. Specimens, in which the stresses were equally distributed longitudinally and throughout the cross section when loaded to the yield point or higher, behaved in HNO_3 in hot NH_4NO_3, and NaOH the same as specimens without any load. Specimens having nonuniform structure longitudinally cracked when exposed to these tests. Specimens in which the stress was locally centralized by notching crashed in 30% NH_4NO_3 under stresses equalling their elastic limit or somewhat lower, but remained unaffected by stresses equalling 80% of their elastic limit. In hot NaOH, low C-steel specimens cracked when the stress applied exceeded their elastic limit by 35–40%. M. Hoseh

Shvarts G.L.

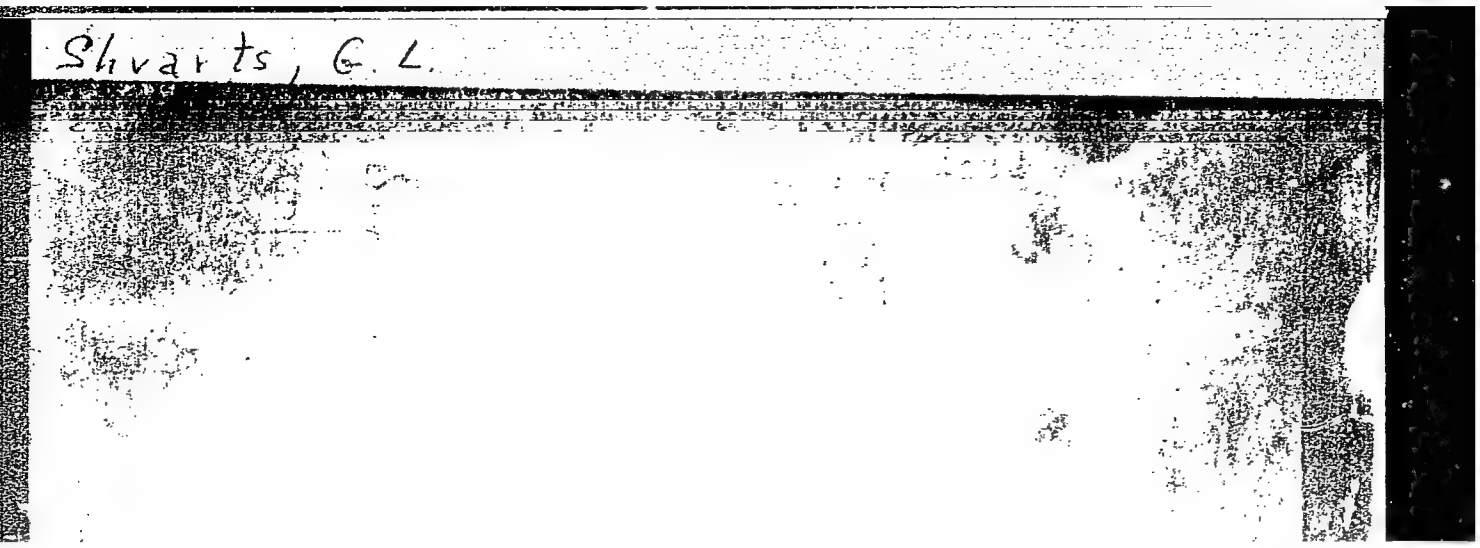
KLINOV, I.Ya., dotsent; SHVARTS, G.L., nauchnyy sotrudnik

Corrosion of some structural steel varieties subjected to stresses. Khim.prom.no.10:297-301 O'47. (MLRA8:12)

1. Moskovskiy institut khimicheskogo mashinostroyeniya
(Steel, Structural--Corrosion)

CA

Corrosion testing of statically stressed metals. I. Ya. Klinov and G. L. Shvarts. *Zavodskaya Lab.* 14, 228–32 (1948).—Testbars, without and with notch, clamped in a special frame and subjected to an axial tension of known magnitude, are exposed to the corrosive medium, and the time elapsing until occurrence of rupture is detd. for various tensile stresses. The plots give regular curves of increasing times with decreasing stress, with asymptotic approach to a lower limit of stress at which no rupture will occur even on very prolonged exposure. N. Thon

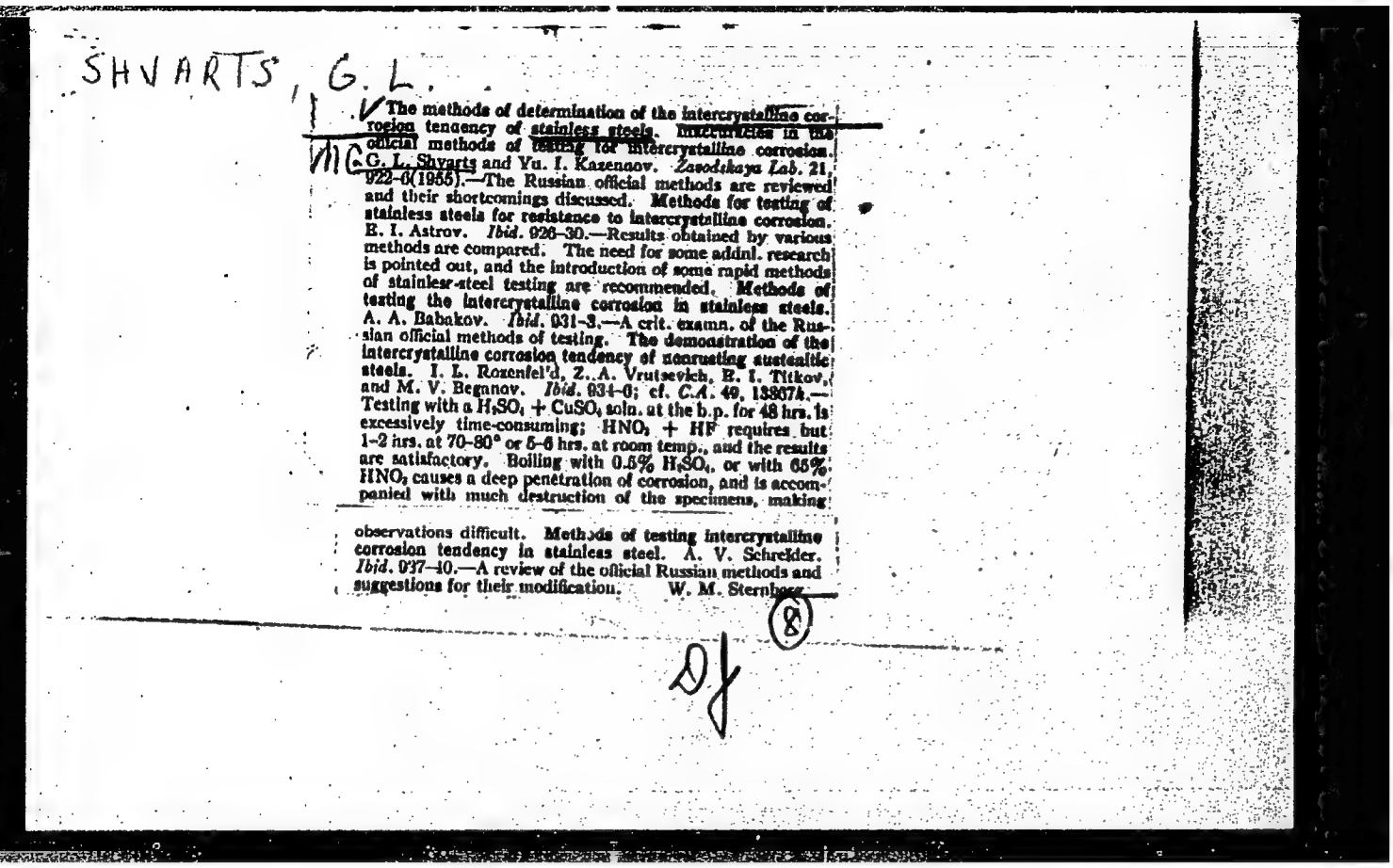


SHVARTS, G.L.

Corrosion of statically strained steels in halide solutions containing oxidants. G. L. Shwarts. *Sbornik Statei Vsesoyuz. Nauch.-Issledovatel. i Konstruktor. Inst. Khim. Mashinostroeniya* 1954, No. 17, 133–42; *Referat. Zhur., Khim.* 1955, No. 8764.—A study of corrosion of several steels in satd. solns. of NaCl, $MgCl_2$, NH_4Cl, NaF, $HgCl_2$, and NH_4I showed that steels 25, 2Cr13, and 1Cr18Ni9T have a tendency to cracking under static stresses approaching their limit of yield. The nature of the cracking depended on the steel. Thus, in steel 25 it was transcryst., in steel 1Cr18Ni9T it was mixed with predominantly intercryst. cracks, and in 2Cr13 it was mixed with transcryst. cracks predominating. Addn. of $NaNO_2$ and $K_2Cr_2O_7$ to the halide salts affected corrosion but the effect varied with the steel. Thus, in steel 25 these addns. increased the tendency to cracking, whereas in the 2 other steels it decreased. This decrease was more pronounced in steel 2Cr13.

M. Hosch

Metal



SHVARTS, G. L.

The methods of determination of the intercrystalline corrosion tendency of stainless steels. Inaccuracies in the official methods of testing for intercrystalline corrosion. G. L. Shvarts and Yu. I. Kazenaov. *Zavodskaya Lab.* 21, 922-6(1955).—The Russian official methods are reviewed and their shortcomings discussed. **Methods for testing of stainless steels for resistance to intercrystalline corrosion.** B. I. Astrov. *Ibid.* 926–30.—Results obtained by various methods are compared. The need for some addnl. research is pointed out, and the introduction of some rapid methods of stainless-steel testing are recommended. **Methods of testing the intercrystalline corrosion in stainless steels.** A. A. Babakov. *Ibid.* 931–3.—A crit. examn. of the Russian official methods of testing. **The demonstration of the intercrystalline corrosion tendency of nonrusting austenitic steels.** I. L. Rozenfel'd, Z. A. Vrutsevich, E. I. Titkov, and M. V. Beganov. *Ibid.* 934–6; cf. *C.A.* 49, 13867h.—Testing with a H_2SO_4 + $CuSO_4$ soln. at the b.p. for 48 hrs. is excessively time-consuming; HNO_3 + HF requires but 1–2 hrs. at 70–80° or 5–6 hrs. at room temp., and the results are satisfactory. Boiling with 0.5% H_2SO_4, or with 65% HNO_3 causes a deep penetration of corrosion, and is accompanied with much destruction of the specimens, making observations difficult. **Methods of testing intercrystalline corrosion tendency in stainless steel.** A. V. Schrekder. *Ibid.* 937–40.—A review of the official Russian methods and suggestions for their modification. W. M. Sternberg

68-6-15/19

AUTHOR: Shvarts, G.L., Candidate of Technical Sciences.

TITLE: Corrosion-resistant Alloys for Pumps for Chemical Departments of the Coking Industry. (Korrozionnostoykiye splavy dlya nasosov khimicheskikh tsekhov koksokhimicheskogo proizvodstva)

PERIODICAL: Koks i Khimiya, 1957, No.6, pp. 51 - 55 (USSR)

ABSTRACT: Results of an investigation on the choice of corrosion-resistant materials for pumps pumping sulphuric acid solutions in sulphate of ammonia and raw benzole rectification plants are given. The chemical composition of materials investigated is given in Table 1. Tests were carried out under laboratory and plant conditions. Testing conditions are given. The results obtained are shown in Fig. 1. The corrosion-resistance was evaluated according to the scale ГОСТ 5272-50. It is concluded that the most suitable material is steel Х32Н27М3А3 (cast and rolled), C 0.04%, Mn 0.56-0.78%, Si 0.23%, Ni 27.6-28.29%, Cr 22.5-23.5%, Mo 2.85-2.91%, Cu 3.46%, P 0.025%, S 0.010%. The velocity of corrosion of this steel in solutions of sulphuric acid (6-12%, 38.5-42.0%, 84.8-93%) at temperatures up to 70 °C does not exceed 0.1 mm/year. For parts requiring higher hardness (Rc 40-50) an alloy of the type Hastelloy D

Card 1/2 (C 0.02-0.08%, Mn 0.37-1.27%, Si 10.74-13.56%, Cu 4.04%

68-6-15/19

Corrosion-resistant Alloys for Pumps for Chemical Departments of the Coking Industry.

Al 1.35-1.85%, Fe, 3.69%, Ni remaining) is recommended. The velocity of corrosion in mother liquor of saturators (6-12% H_2SO_4) at 70 °C is 2 mm/year; in 38.5% H_2SO_4 up to 0.5 mm/year; in concentrated acid at 70 °C up to 0.1 mm/year.
There is 1 table and 2 figures.

ASSOCIATION: NIIKhIMMASh

AVAILABLE: Library of Congress

Card 2/2

SHVARTS, Galina Lazarevna

N/5
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.S5

Korroziya Khimicheskoy Apparatury; Korrozionnoye Rastreskivaniye I Metody Yego Predotvrashcheniya (The Corrosion Of Chemical Apparatus; Corrosive Disintegration And Methods Of Preventing It, by) G. L. Shvarts, (I) M. M. Kristal'. Moskva, Mashgiz, 1958.

203 P. Illus., Diagrs., Graphs, Tables.

"Literatura": P. 197-202.

SOV/136-58-12-17/22

AUTHORS: Shvarts, G.L. and Kuznetsova, Yu.S.

TITLE: Use of Acid-resistant Steels for Making Plant for Certain Hydro-metallurgical Processes (Primeneniye v nekotorykh gidrometallurgicheskikh protsessakh kislotostoykikh staley dlya izgotovleniya oborudovaniya)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 12, pp 79 - 80 (USSR)

ABSTRACT: Developments in the nickel-cobalt industry require new plant for working at high temperatures (and sometimes pressures) in highly corrosive media. The authors describe their work in collaboration with G.N. Dobrokhotov and A.F. Samsonova of the Gipronikel' Institute on the selection of corrosion-resistant steels for reactors for acid leaching of sulphide materials containing 33-76% Ni, up to 5% Cu, up to 7% Co and 3-30% Fe. Two liquids, corresponding to processes at the Yuzhuralnikel' and Severonikel' Combines, were used in the tests. Test temperatures were 135 ± 3 °C, oxygen pressures 10 atm gauge and stirring intensity corresponding to Re = 20 000, duration 500 hours. Of the steels tested, types Kh18N12M2T, Kh18N12M3T and Kh23N28M3D3T showed satisfactory loss-of-weight characteristics but the first developed cracks in welded joints (Figure 2). Best

Cardl/2

Use of Acid-resistant Steels for Making Plant for Certain Hydrometallurgical Processes

results were obtained with type OKh23N28M3D3T (EI943) low-carbon steel and the authors recommend this for acid leaching of sulphide materials. In further work effected under laboratory conditions, the authors found the following steels best for continuous vacuum evaporation plant: 1Kh18N9T for copper sulphate solution; Kh18N12M2T for zinc sulphate solutions at temperatures below 105 °C, OKh23N28M3D3T (EI943) for nickel sulphate below 105 °C. Special treatment for weld seams is desirable and the last steel can be used for nickel mother liquors if the temperature is reduced to 80 °C. There are 2 figures.

ASSOCIATION: NIIKhIMMASh

SOV/81-59-12-42695

Translation from: Referativnyy zhurnal: Khimiya, 1959, Nr 12, p 268 (USSR)

AUTHORS: Shvarts, G.L., Kuznetsova, Yu.S.

TITLE: Methods for Determining the Susceptibility of Kh23N23M3D3, Kh23N27-M3D3T and Kh23N27M2T Steels to Intercrystallite Corrosion

PERIODICAL: Sb. statey. Vses. n.-i. i konstrukt. in-t khim. mashinostr., 1958, Vol 25, pp 47-56

ABSTRACT: It is recommended to determine the susceptibility of copper-containing steels Kh23N23M3D3 and Kh23N27M3D3T to intercrystallite corrosion (IC) on samples in the state of delivery and after thermal treatment at 700°C (keeping them for 10 - 20 minutes and cooling in the air) in a boiling sulfuric acid $CuSO_4$ solution with the addition of zinc dust (5 g per 1 l of solution). The duration of the test was 144 hours. The determination of the susceptibility of St. Kh23N27M2T to IC was carried out under the same conditions, but during 3 cycles it was carried out every hour at 80°C replacing the solution every hour. There were 5 cycles of umpire control in a solution (in percent): HNO_3 10 + NaF 2 at 80°C. The sharp in-

Card 1/2

SOV/81-59-12-42695

Methods for Determining the Susceptibility of Kh23N23M3D3, Kh23N27M3D3T and Kh23N27M2T Steels to Intercrystallite Corrosion

crease in the penetration depth of IC with an increase in the duration of the test of Kh23N27M3D3T steel has been found. This is not observed in St. Kh23N23-M3D3, and Kh23N27M2T.

From the authors' summary

Card 2/2

SOV/81-59-16-57432

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 16, p 260 (USSR)

AUTHORS: Kazennov, Yu.I., Shvarts, G.L., Akshentseva, A.P., Kolosova, L.P., Kuznetsova, Yu. M.

TITLE: On the Application of Non-Stabilized Acid-Resistant Chromium-Nickel Steels Containing Copper

PERIODICAL: Sb. statey. Vses. n.-i. i konstrukt. in-t khim. mashinostr., 1958, Vol 25, pp 57-74

ABSTRACT: Experimental data have shown that: 1. The Kh23N23M3D3 steel with a content of C > 0.06% acquires an inclination to intercrystallite corrosion (IC) after short-time heating in the range of 600 - 900°C. The longer is the heating, the broader the dangerous temperature range. 2. The time of the stable state during heating in the dangerous range of temperatures is the longer, the lower the C content in the steel. 3. The introduction into the steel of Mo in quantities exceeding even 25 times its amount in relation to C shows no stabilizing effect. The Kh18N28M3D3 steel acquires also an inclination to IC after short-time heating in the dangerous temperature range in spite of the fact that the C content in it is only 0.03% in all. Apparently the appearance of an inclination to IC in the Kh23N23M3D3

Card 1/2

S/081/61/000/008/007/017
B110/B203

AUTHOR: Sidorkina, Yu. S., Shvarts, G. L.

TITLE: Corrosion resistance of high-alloy steels in sulfuric acid solutions

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 8, 1961, 289, abstract 8И189 (8I189) (Vestn. tekhn. i ekon. inform. N. -i. in-t tekhn.-ekon. issled. Gos. kom-ta Sov. Min. SSSR po khimii, 1959, no. 3 (15), 10 - 14)

TEXT: It is stated that ОХ23Н28М3Д3Т (OKh23N28M3D3T) steel with < 0.06% C content is not subject to intercrystallite corrosion and can be recommended for the production of welded constructions which are operated in sulfuric acid solutions. [Abstracter's note: Complete translation].

Card 1/1

82784

SOV/184-59-5-13/17

18.9530

AUTHOR: Shvarts, G.L., Candidate of Technical Sciences

TITLE: Some Metal Materials for Chemical Equipment

PERIODICAL: Khimicheskoye mashinostroyeniye, 1959, Nr. 5, pp. 39-42 (USSR)

ABSTRACT: The author summarizes the studies carried out during the past five years by NIIKhIMMASh in co-operation with the institutes of steel of TsNIIChM, NIUIF, Gipronikel, Institut fizicheskoy khimii AN SSSR (Institute of Physical Chemistry of the AS USSR) and other institutions on technological properties and corrosion resistance of new steels "Kh18N28M3D3" (Kh18N28M3D3), "Kh23N23M3D3" (Kh23N23M3D3), "Kh23N28M3D3T" (Kh23N28M3D3T), "Kh23N27M2T" (Kh23N27M2T), alloy Ni-Si-Cu, "AV2" (AV2), aluminum, "VT-1" (VT-1), titanium and some other materials. NIIKhIMMASh worked out methods of welding, bending and stamping these steels and studied their corrosion resistance. Two methods of welding are possible: an argon-arc method with a fusible electrode made of "OKh23N28M3D3T" (OKh23N28M3D3T) steel wire and a manual arc method with the same electrode wire having an "15M" coating. Special methods of testing the corrosion resistance of new steels were developed which were included in the new standard "ГОСТ 6032-58" (GOST 6032-58) which specifies tests of stainless

Card 1/6

steels for intercrystalline corrosion. Laboratory and industrial tests (Engineer Yu.S. Sidorkina participated besides the author) have shown that the Kh18N28M3D3 steel is unsuitable for chemical equipment because of its tendency to intercrystalline corrosion after welding, and sometimes in the initial state, even at a carbon content of 0.03 and 0.05%. The same results were obtained by the Institute of Physical Chemistry of the AS USSR for Kh23N23M3D3 steel. The Kh23N28M3D3T steel, at a carbon content not over 0.07% and titanium content not less than 5 times that of carbon, does not show any tendency to intercrystalline corrosion after welding and other operations, involving heating for 10-20 minutes within the critical temperature range. Similar results were obtained with a 0.06% carbon content. At a temperature of 80°C Kh23N27M2T steel is stable in sulfuric acid solutions below 20% concentration. It is suitable for equipment working in phosphoric acid solutions and in phosphoric acid extraction. It is not subject to corrosion cracking in concentrated caustic soda solutions and is recommended like "Ni" (N1) nickel for work in such media. The Kh23N28M3D3T steel and its welds are stable against general corrosion in sulfuric acid of any concentration at temperature of up to 80°C and in several media containing sulfuric acid. With a carbon content below 0.06% this steel is called 0Kh23N28M3D3T - "ЭИ943" (EI943) - and its welds do

Some Metal Materials for Chemical Equipment

not show any tendency to intercrystalline corrosion in all technological media and test solutions (according to GOST 6032-58). This steel is prone to corrosional cracking in sulfuric acid of 20-50% concentration under the simultaneous action of the media and the residual stresses arising at welding, cutting on guillotine shears, rolling etc. Cracking of a transcrystalline nature occurs in tubes welded of OKh23N28M3D3T steel within the above range of sulfuric acid concentration. This is not the case in concentrations under 20% and over 50%. Tempering at 950°C with air cooling takes off residual stresses and prevents cracking. The corrosion resistance of OKh23N28M3D3T decreases in the presence of sulfuric acid solutions of reducers, e.g. hydrogen sulfide. This steel is recommended for pumps of coke chemical plants, reactors for acid lixiviation of nickel-cobalt concentrates, evaporators in non-ferrous metallurgy etc. Equipment made of this steel is already used in the industry. Pumps "2XΦ6" (2KhF6) and "2ΦXC6" (2FKhS6) were designed for the Moskovskiy koksogazovyy zavod (Moscow Coke Gas Plant) and Shchelkovskiy khimicheskiy zavod (Shchelkov Chemical Plant) and were tested in 50-60% sulfuric acid at 50-60°C. An installation for an automatic control of the superphosphate production process was developed. The supply control assembly for 40% sulfuric acid includes a pneumatic control valve made of Kh23N28M3D3T steel.

Card 3/6

82784

SOV/184-59-5-13/17

Some Metal Materials for Chemical Equipment

In NIIKhIMMASh an optimum composition of an alloy stable under conditions of sulfuric acid vacuum evaporation was found. Its technological properties were determined by Candidates of Technical Sciences I.N. Yukalov, Yu.I. Kazenov, G.L.. Shvarts, Engineers A.V. Nosov, G.A. Shumratova, Yu.S. Sidorkina in cooperation with teams of casting, welding and corrosion laboratories. The alloy composition is: 11.2-12% Si, 4-4.5% Cu, the rest Ni; admixtures not over: 0.1% Mn, 0.1% Al, 0.5% Fe, 0.1% C, 0.01% S. An additional alloying with aluminum and manganese leads to a decrease of its corrosion resistance in boiling sulfuric acid. This alloy is more corrosion resistant at a limited access of oxygen to sulfuric acid of medium concentrations than at an excess of oxygen. This alloy is welded in special furnaces by the manual arc method using electrodes of the same alloy with a "ЭНХД-10" (ENKhD-10) coating. The blanks are heated to 700-720°C and the welded parts are cooled together with the furnace. Continuous tests carried out in 1958 have shown that the Ni-Si-Cu alloy is suitable for building heater elements of industrial evaporating installations working under pressure. Candidates of Technical Sciences A.N. Krutikov and F.B. Slomyanskaya (deceased) of NIIKhIMMASh studied corrosional cracking of welded cylinders of autoclaves for producing highly concentrated nitric acid by direct synthesis. It was found that the life of cylinders made of "АВ2" (AV2) aluminum, welded

Card 4/6

by the manual arc method, was not longer than 9 months due to the destruction of the seam metal by intercrystalline corrosion. At cylinder wall thickness of 25 mm the rate of local destruction in welded seams was higher than 30 mm/year. It was recommended to use either the automatic argon-arc method with seam peening or automatic welding with the "AB000" (AV000) electrode alloyed with titanium. In some technological media, e.g. crude tungsten concentrates, the existing corrosion-resistant alloys cannot be used. Besides tungsten and molybdenum these media contain sulfur compounds (Na_2S, H_2S), fluorine compounds (CaF_2, HF) and hydrochloric acid. The results of continuous tests carried out by NIIKhIMMASh on various metals and alloys used in the equipment of a concentrator plant were compiled in a graph, Figure 4. In the first media, judging by the loss of weight, all tested materials are fairly stable (corrosion rate 0.1-0.15 g/m^2 hour). However, Kh23N28M3D3T steel and EI435 and EI461 alloys showed point and local corrosion, respectively. Tantalum, VT1 titanium, "OT 4" (OT4) titanium alloy and antichlor alloy have the highest corrosion resistance under conditions of molybdenum trisulfide drying. All tested materials except titanium, OT-4 alloy and tantalum have a reduced resistance in the second medium. Specimens of Kh23N28M3D3T, EI461 and EI435 alloys showed considerable point corrosion. Antichlor, EI435,

IX

82784

Some Metal Materials for Chemical Equipment SOV/184-59-5-13/17

EI461 and OT-4 alloy have also a reduced resistance in the third medium. Although the rate of corrosion of KH23N28M3D3T is below 0.01 g/m^2 hour, welded specimens are subject to a considerable local corrosion in the fusion zone. It is the same with the OT-4 alloy. Titanium and tantalum have a high corrosion resistance and can be recommended for single-roller driers for highly aggressive concentrates of tungstic acid and molybdenum trisulfide. There are 2 photographs, 1 table and 2 diagrams.

IX

Card 6/6

SOV/136-59-7-14/20

AUTHOR: Shvarts, G.L., Candidate of Technical Sciences

TITLE: Construction Materials for Plant for Treating Complex Molybdeno-Tungsten Concentrates by the Autoclave Method

PERIODICAL: Tsvetnyye metally, 1959, Nr 7, pp 78-79 (USSR)

ABSTRACT: Autoclave-soda treatment has proved very effective for treating molybdeno-tungsten concentrates. The products for filtration, however, are highly corrosive and the NII[illegible]MMASh in 1958 carried out tests of various metals and alloys in working plant; directly in the drying hearth of the calcining furnace at 120 - 200°C (55-70% H_2O; 0.6 - 1 g/litre HCl and Na_2S; SiO_2, H_2S as impurities); in the drying drum at a steam temperature of 140°C (2-10 g/litre HCl; 5-15% CaF_2; 10-15% H_2O, up to 5% SiO_2, HF and other impurities); in the intake tank of the filter press at 80-90°C (40-50 g/litre NaCl; 0.6 - 1 g/litre HCl and other impurities; solid : liquid = 1 : 15). The materials tested were: Kh23N28M3D3T steel, nichrome (EI 435), nickel-molybdenum alloy type EI 461, nickel-silicon alloy (hastelloy D), antikhlor, VT-1 titanium;

Card 1/2

Construction Materials for Plant for Treating Complex Molybdeno-Tungsten Concentrates by the Autoclave Method

OT-4 titanium alloy and tantalum. Test results are shown graphically. VT-1 titanium and tantalum had good resistance to corrosion. There is 1 figure.

ASSOCIATION: NIIKhIMMASh

SHVARTS, G.L.

TITLE: Conference on Autoclave Processes

PERIODICAL: Tsvetnyye metally, 1959, Nr 7, pp 84-87 (USSR)

ABSTRACT: On 23-26 February 1959 a conference was held in Moscow for summing-up and coordinating work on autoclave processes in the metallurgy of heavy, non-ferrous, rare and noble [illegible]. The conference heard reports as follows: D.M. Yukhtanov, Gintsvetmet, on progress throughout the world on the use of hydrometallurgical, particularly autoclave, methods for non-ferrous and rare metal production; G. N. Dobrokhotov, Gipronikel', on nickel leaching practice at some Soviet works; N. I. Onuchkina and G. N. Dobrokhotov on the thermodynamics and kinetics of the selective reduction by hydrogen and carbon monoxide under pressure of nickel and cobalt from solution; I. Yu. Leshch and K. M. Shelepova, Gipronikel', on design decisions on the application of the flowsheets dealt with by G. N. Dobrokhotov at the Yuzhuralnikel' and Severonikel Combines and the Ufaleyskiy (Ufa) Nickel Works; I. N. Maslenitskiy, Leningradskiy gornyy institut (Leningrad Mining Institute) on the advantages of a combined flotation-autoclave method for nickel-electrolysis of slimes containing platinum-group metals; V. B. Zhilkin, Severonikel' combine, and S. I. Sobol', Gintsvetmet, on the essentials of the neutral method of oxidizing leaching of nickel concentrate from converter-matte flotation; S. I. Sobol' on preliminary investigations on the development of a sulphurous-sulphuric method for leaching nickel and cobalt from oxidized nickel ores; N. N. Maslenitskiy, Mekhanobr, on the main results of investigations of the autoclave-soda process for treating tungsten-ore beneficiation products;

Card 1/5

V. I. Ponrukaylo, Mekhanobr, and D. A. Malakhov, Skopinskaya (Skopinsk) TsOF, separately, on problems in the application of an autoclave-soda flowsheet to scheelite and wolframite raw material; G. A. Meyerson, K. Ya. Shapiro, N. N. Khavskiy, R. A. Pavlyuk and A. P. Nadol'skiy, Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Non-Ferrous Metals Institute) on the treatment of tungsten concentrates in hermetical, heated ball-mills with acids or caustic alkalies; V. I. Spiridonova, S. I. Sobol', Ye. I. Gulyayeva, Z. L. Berlin, I. M. Nelen' and B. I. Rudenko, Gintsvetmet, on the treatment of prepared and unprepared sulphide molybdenum raw material by oxidizing autoclave alkaline leaching; I. M. Nelen' and S. I. Sobol' on the kinetics of oxidizing autoclave leaching; A. N. Zelikman and Z. M. Lyapina, Krasnoyarsk Non-Ferrous Metals Institute, on the results of a study of conditions for the selective separation of lower oxides of tungsten and molybdenum from their salt solutions by hydrogen under pressure; M. V. Darbinyan, Gorno-

Card 2/5

metallurgicheskiy institut (Mining-Metallurgical Institute) of the Sovnarkhoz (economic council) of the Armyanskaya SSR (Armenian SSR), on his investigations of ammoniacal autoclave leaching under oxygen pressure of molybdenum concentrates; S. I. Sobol' on technical-economic factors of ammoniacal leaching; A. I. Sinel'nikova and I. N. Plaksin, Krasnoyarsk Non-Ferrous Metals Institute, on an oxidizing autoclave process for gold-containing raw material; N. G. Tyurin, Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) on the behaviour of noble metals in oxidizing autoclave leaching in thiosulphate solutions; A. L. Tseft and D. A. Taraskin and A. Yu. Dadabayev, Institut metallurgii i obogashcheniya AN Kaz SSR (Metallurgy and Beneficiation Institute of the AS Kaz SSR), respectively, on the physicochemical fundamentals and on works' trials of autoclave salt leaching of polymetallic materials; I. Yu. Leshch, Gipronikel', on the unsuitability of autoclave leaching for lime-containing materials; V. A. Bernshteyn, VAMI, on industrial experience of a continuous autoclave leaching process for bauxites; V. G. Tronev, IONKh AN

Card 3/5

SSSR (IONKh AS USSR), on compounds of some rare elements in various valency states under oxygen and hydrogen pressure in the presence of anhydrous ammonia; Z. L. Berlin, Gintsvetmet, on autoclave design and operation; P. G. Yakovlev, Gipronikel', and N. Ye. Vishnevskiy, VNII neftekhim, on model studies on autoclaves and the development of mixers; M. A. Polyanov, K. B. Giredmet, on the design of an experimental high-pressure pulp pump. G. L. Shvarts, NIIKhIMMASh, on the selection of steel for acid leaching of cobalt matte and matte-flotation concentrate; Yu. I. Archakov, VNIIneftekhim, on corrosion of type 1Kh18N9T, 12KhGN, 10KhGND and 10GND steels in soda and alkaline solutions in the presence of metal salts and oxygen at 5 - 15 kg/mm²; V. I. Deryabina and N. N. Kalgatin, VNIIneftekhim, separately, on mechanical properties of hydrogen-affected steels. The conference made recommendations aimed at the extension and improve-

Card 4/5

SHVARTS, G.L., kand.khim.nauk; SIDORKINA, Yu.S.

Nickel-silicon alloy used in the construction of parts for sulfuric acid concentrators. Khim.prom. no.7:631-633 O-N '59. (MIRA 13:5)

1. Nauchno-issledovatel'skiy institut khimicheskogo mashinostroyeniya.
(Nickel-silicon alloys)
(Sulfuric acid industry--Equipment and supplies)

SLOMYANSKAYA, F.B., kand.tekhn.nauk [deceased]; SHVARTS, G.L., kand.tekhn.nauk; KHIMUSHIN, F.F., kand.tekhn.nauk; ISTRINA, Z.F., inzh.; SIDORKINA, Yu.S., inzh.

Testing for intercrystalline corrosion of stainless austenite and austenite-ferrite steels. Trudy NIIKHIMMASH no.27:3-53 '59. (MIRA 14:8)

(Steel, Stainless--Testing)

SHVARTS, G.L., kand.tekhn.nauk; SIDORKINA, Yu.S., inzh.

Alloys resistant to sulfuric acid and other corrosive media.
Trudy MIKHIMMASH no.27:54-61 '59. (MIRA 14:8)
(Corrosion-resistant materials)

SHVARTS, G.L., kand.tekhn.nauk; SIDORKINA, Yu.S., inzh.

Materials for equipment used in some processes of the hydrometallurgy of nonferrous metals. Trudy NIIKHIMMASH no.27:62-74 '59. (MIRA 14:8)
(Corrosion-resistant materials)
(Hydrometallurgy) (Nonferrous metals)

SHVARTS, G.L.

PHASE I BOOK EXPLOITATION SOV/4535

Vsesoyuznyy sovet nauchno-tekhnicheskikh obshchestv

Mezhkristallitnaya korroziya i korroziya metallov v napryazhennom sostoyanii (Intercrystalline and Stress Corrosion of Metals) Moscow, Mashgiz, 1960. 358 p. 3,000 copies printed.

Ed.: I.A. Levin, Candidate of Technical Sciences; Ed. of Publishing House: I.I. Lesnichenko, Engineer; Tech. Ed.: V.D. El'kind; Managing Ed. for Literature on Metalworking and Instrument Making (Mashgiz): V.V. Rzhavinskiy, Engineer; Editorial Board: I.A. Levin, Candidate of Technical Sciences (Chairman), V.P. Batrakov, Candidate of Technical Sciences, V.M. Nikiforova, Candidate of Technical Sciences, and A.V. Turkovskaya, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for technical personnel concerned with problems of corrosion of metals.

COVERAGE: The collection contains discussions of intercrystalline corrosion of stainless steels and stress corrosion of carbon steels, low-alloy and stainless steels, and light-weight and nonferrous alloys. The tendency of steels of various composition and system to corrode under certain conditions is discussed and the nature of corrosion and corrosion cracking is analysed. No personalities are mentioned. Most of the articles are accompained by bibliographic references, the majority of which are Soviet.

II. INTERCRYSTALLINE CORROSION OF STAINLESS STEELS

Cheskis, Kh. I., Candidate of Technical Sciences, S.I. Vol'fson, and Yu. S. Medvedev, Engineer. Effect of Slow Heating on the Tendency of 1Kh18N9T Steel Toward Intercrystalline Corrosion 27

Khimushin, F.F., Candidate of Technical Sciences, and Z.P. Istrina, Junior Scientific Worker. Study of the Tendency of the 0Kh18N9, 1Kh18N9, and 1Kh18N9T Types of Chromium-Nickel Steels Toward Intercrystalline Corrosion 45

Medovar, B.I., N.A. Langer, and M.M. Kurtepov, Candidates of Technical Sciences. Intercrystalline Corrosion Concentrated Along the Fusion Line of Welded Joints of the 18-8 Type Stabilized Steels ("Knife"-Type Corrosion) 59

Levitin, V.V., and L.V. Mironov. Effect of the Electric Heating of the 1Kh18N9T Steel on the Processes Determining Its Resistance to Intercrystalline Corrosion 71

Davidovskaya, Ye. A., Candidate of Technical Sciences, L.P. Kestel', Engineer, and Ye. I. Urvupina, Candidate of Technical Sciences. Effect of the Heat Treatment of Some Stainless Steels on Their Tendency Toward Intercrystalline Corrosion 79

Talov, N.P., Engineer. Intercrystalline Sea-Water Corrosion of Austenitic High-Strength Steels 92

Shvarts, G.L., Candidate of Technical Sciences, and Yu. S. Kuznetsova, Engineer. Intercrystalline Corrosion and Corrosion Cracking of Stainless High-Alloy Austenitic Steels 110

Kotova, Ye. V., Engineer. Tendency of Chromium-Nickel-Molybdenum-Copper Steels Toward Intercrystalline Corrosion 126

Babakov, A.A., Candidate of Technical Sciences. Development of Two-Phase Steels-An Effective Means of Increasing Stainless Steel Resistance to Intercrystalline Corrosion 145

Levin, I.A., Candidate of Technical Sciences. More on the Problem of the Causes of Stainless Steel Intercrystalline Corrosion 148

Vedeneyeva, M.A., Engineer, and N.D. Tomashov, Doctor of Chemical Sciences, Professor. Determining Intercrystalline Corrosion of Chromium-Nickel Austenitic Steels by Measuring the Internal Friction 152

Card 4/9

SHVARTS, G.L., kand.tekhn.nauk; KRISTAL', M.M., inzh.

New articles on the corrosion and protection of steels. Khim. mash. no.2:47-48 Mr-Ap '60. (MIRA 13:6)
(Steel--Corrosion)

S/184/60/000/004/003/021
A109/A029

18.1285

AUTHORS: Shvarts, G.L., Candidate of Technical Sciences, Chistyakova, A.N., Markova, L.S., - Graduate Engineers

TITLE: The Manufacture of Apparatus From Titanium

PERIODICAL: Khimicheskoye Mashinostroyeniya, 1960, No. 4, pp. 8 - 10

TEXT: This article, compiled in cooperation with Graduate Engineers M.M. Abelev and A.V. Nosov, states that tests carried out by NIIKhIMMASh have established the high corrosion resistance of BT1 (VT1) titanium. An unidentified plant produces single-roller СОАА (SOAA) dryers with cast iron, steel and titanium parts. The dryer is designed for highly aggressive concentrates used in non-ferrous metal production, containing sulfur compounds and hydrochloric acid. Its only other non-corrosive component is tantalum. Pulps of these concentrates are filtered through ЛГ-130Т (LG-130T) titanium filters designed by V.P. Abramov. In coke plants VT1 titanium proved absolutely corrosionproof and superior to highly-alloyed steels. Based on these results a saturator pipe and a rectifier were designed. The importance of surface cleanliness of walls on corrosion resistance was tested on 6-mm VT1 titanium and ОТ4 (OT4) alloy. It results from

Card 1/2

The Manufacture of Apparatus From Titanium

S/184/60/000/004/003/021
A109/A029

laboratory tests of NIIKhIMMASh and foreign papers (Refs. 1 and 2) that in most media the corrosion resistance of titanium is not higher than the resistance of acid-resistant steels. Chloride solutions containing moist chlorine, carbamide solutions, and sulfur solutions containing SO_2, H_2S and chlorine ions, are an exception to this rule. In these solutions titanium proved non-corrosible whereas highly-alloyed steels were subject to pitting, total corrosion or transcrystalline cracking. Welded titanium tubings produced by the Moskovskiy trubnyy zavod (Moscow Pipe Plant) and tested under similar conditions showed no loss of weight and no traces of corrosive cracking. 1X18H9T (1Kh18N9T) acid-resistant steel shows pitting corrosion in chloride solutions containing $KClO_3$, and X18H12M2T (Kh18N12M2T) steel shows scar corrosion. VT1 titanium and OT4 alloy retained their original weight and showed no corrosive cracks. They are recommended for equipment operating in media which cause pitting and scar corrosion or transcrystalline fractures on acid-resistant steels. They are also suitable for chlorine processing where they can replace tantalum and nickel-based alloys. There are 3 figures, 2 tables and 2 English references.

Card 2/2

SHVARTS, G.L.

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S/129/60/000/08/009/009
E073/E135

AUTHORS: Kuznetsova, Yu.S. (Engineer), and Shvarts, G.L. (Candidate of Technical Sciences)

TITLE: Corrosion Cracking of Chromium-Nickel-Molybdenum-Copper Steels in Sulphuric Acid Solutions

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, No 8, pp 53-56 (+ 2 plates)

TEXT: The authors summarise earlier results and results published in literature on the subject. These are supplemented by further results obtained under laboratory conditions of investigation of commercially produced welded tubes of the steel Kh23N28M3D3T and also of sheet specimens of the same steel and of the steel Kh23N23M3D3. Most of the experiments were carried out in sulphuric acid solutions with various concentrations at 80 °C and at boiling point. The test results for periods of 1000 hours and longer are entered in a Table, p 54. In addition to sulphuric acid solutions, the experiments were carried out in sulphuric acid solutions of nickel sulphate containing: $NiSO_4$ 125 g/litre; $CuSO_4$ 0.5 to 1 g/litre; H_2SO_4 200 g/litre at 60 °C, and $NiSO_4$ 250 g/litre; $CuSO_4$ 1 to 2 g/litre; H_2SO_4 400 g/litre at 105 °C. The results are summarized thus:

Card 1/3

81882

S/129/60/000/08/009/009
E073/E135

Corrosion Cracking of Chromium-Nickel-Molybdenum-Copper Steels in Sulphuric Acid Solutions

1) The chromium-nickel-molybdenum-copper steels Kh18N28M3D3, Kh23N23M3D3, Kh23N28M3D3T and OKh23N28M3D3T, which are recommended for operation in sulphuric acid media, are prone to intercrystallite corrosion. Of these the first two mentioned ones have the strongest tendency to develop intercrystallite corrosion and, therefore, should not be used for welded equipment intended to operate in media containing sulphuric acid.
2) Welded seams of the steel Kh23N28M3D3T containing less than 0.06% C are not prone to intercrystallite corrosion. Therefore, this steel is recommended for welded equipment intended for operation in solutions containing sulphuric acid.
3) In the case of residual stresses, the investigated steels are prone to transcrystalline corrosion cracking in sulphuric acid tests (20, 30, 40 and 50 wt.%) at 80 °C and at the boiling temperature.

Card 2/3

81882

S/129/60/000/08/009/009
E073/E135

Corrosion Cracking of Chromium-Nickel-Molybdenum-Copper Steels in Sulphuric Acid Solutions

4) Heating of the steel Kh23N28M3D3T at 950 °C followed by cooling in air reduces its tendency to corrosion cracking under stress corrosion conditions.

There are 3 figures, 1 table and 8 Soviet references.

Card 3/3

S/1[illegible]/62/000/008/004/009
D040/D112

AUTHORS: Shvarts, G.L., Candidate of Technical Sciences; Makarova, L.S., Engineer

TITLE: Titanium applications in chemical industry equipment

PERIODICAL: Khimicheskoye mashinostroyeniye, no.6, 1962. 18-23

TEXT: Recommandations are made on the applications of BT1 (VT1) commercially pure titanium and OT4 (OT4) titanium alloy with Al and Mn in the chemical industry, based on extensive tests and electronographic investigations at NIIKhIMMASh. Titanium is especially considered as a replacement for scarce and expensive nickel alloys and high-alloy special steels. Chemical machine-building plants are now starting to produce reactors, separators, filters and heat exchangers from titanium. The results of corrosion tests of VT 1 and OT 4, considered the best Ti compositions for the chemical industry, are given in a table in comparison with three high-alloy steels. The tests were conducted in various media characteristic in the production of synthetic fibers, dyes, sulfuric acid, carbamide,

Card 1/2

Titanium applications in . . . S/184/62/000/006/004/008
D040/D112

titanium, tungsten and molybdenum, nickel, etc. Recommendations are given as to the processes or media in which VT1 can be used and in which it cannot. VT1 is being produced in the USSR in 0.5 to 70 mm thick sheets, as well as in the form of forgings, bars, wire and tubes. NIIKhIMMASh found that forming processes without heating to high temperature do not affect the corrosion resistance of Ti. There is 1 table.

Card 2/2

BORISOGLEBSKIY, B.N., kand. tekhn. nauk, red.; VINOGRADOV, Yu.M., kand. tekhn. nauk, red.; GALITSKIY, B.A., red.; GORYAINOVA, A.V., kand. tekhn. nauk, red.; ZHEREBTSOV, A.N., red.; KORETSKIY, I.M., red.; MAKAROVA, N.S., red.; MORDOVSKIY, S.I., kand. tekhn. nauk; SALAMATOV, I.I., doktor tekhn. nauk; SHVARTS, G.L., kand. tekhn. nauk, red.; YUKALOV, I.N., kand. tekhn. nauk, red.; YUSOVA, G.M., kand. tekhn. nauk, red.; VASIL'YEVA, G.N., red.

[Manufacture of filters in the U.S.S.R.; collection of reports at the united session of the scientific and technical councils of the All-Union Scientific Research Institute of Chemical Machinery, the Ukrainian Scientific Research Institute of Chemical Machinery and the technical council of the Ural Chemical Machinery Plant] Fil'trostroenie v SSSR; sbornik dokladov na ob"edinennoi sessii nauchno-tekhnicheskikh sovetov Niikhimmasha, Ukrniikhimmasha i tekhnicheskogo soveta zavoda "Uralkhimmash." Moskva, Otdel nauchno-tekhn. informatsii, 1963. 107 p. (MIRA 17:12)

1. Nauchno-issledovatel'skiy institut khimicheskogo mashinostroyeniya (for Borisoglebskiy, Mordovskiy).

L 8716-65 EWT(m)/EPR/EWP(k)/EWP(b) Pf-4/Ps-4 ASD(m)-3/AEDC(a) MJW/JD/HM/WB

ACCESSION NR: AP4002092 S/0125/63/000/012/0058/0060

B

AUTHOR: Shvarts, G. L.

TITLE: Test of corrosion resistance of titanium welds

SOURCE: Avtomat. svarka, no. 12, 1963, 58-60

TOPIC TAGS: titanium weld, weld corrosion, titanium corrosion, oxidizing medium, nonoxidizing medium, titanium, titanium alloy, alloy welding, VTI technical titanium

ABSTRACT: In a continuation of his own previous investigations, the author studied the corrosion resistance of commercial grade Ti (VT-1) welds on a special device (see Fig. 1 in the Enclosure) at temperatures of 95-98C in both oxidizing and nonoxidizing media. The oxidizing medium contained a solution of 160 g/liter $KClO_3$, 480 g/liter $CaCl_2$ and 25 g/liter KCl (at 95C); no significant differences were detected between the action on the base metal and weld metal in this medium. The nonoxidizing medium consisted of 50% formic acid (at temperatures above 95C) and caused higher corrosion of the weld metal in comparison with the base metal. The results of electrochemical tests showed that after 50 hours in both oxidizing and nonoxidizing media, the base metal-weld metal galvanic element stopped working and the amperage was zero. Corrosion resistance was also studied by the weight loss in

Card 1/3

L 8716-65
ACCESSION NR: AP4002092

oxidizing medium showing a similar corrosion rate for the base metal and weld metal (without contact) of 0.0005 mm/year. The difference in the corrosion rate was also insignificant for contacting samples: base metal = 0.0004 mm/year and weld metal = 0.0009 mm/year. In formic acid, the weld metal had a corrosion rate of 0.0013 mm/year and the base metal had a rate of 0.001 mm/year, both with and without contact. On this basis, the author concludes that the weld metal and base metal have a similar corrosion stability. "Eng. L. S. Makarova also took part in the work." Orig. art. has: 2 figures and 1 table.

ASSOCIATION: NIIKhimmash

SUBMITTED: 19Feb63 ENCL: 01

SUB CODE: MM NO REF SOV: 004 OTHER: 001

Card 2/3

L 8716-65
ACCESSION NR: AP4002092

ENCLOSURE: 01
0

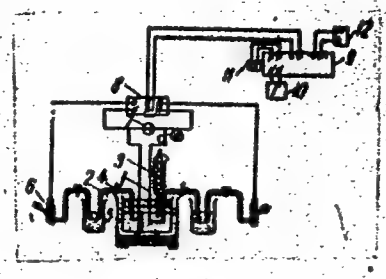

Fig. 1. Device for testing contact corrosion
1 - electrode pairs: base metal (large sample) and weld metal (small sample), the electrode gap is 5 mm; 2 - bath with electrolyte; 3 - ball-type reflux condenser; 4 - liquid bridge; 5 - water bath; 6 - calomel half-cell; 7 - milliammeter; 8 - switch; 9 - high-resistance DC potentiometer; 10 - detecting galvanometer; 11 - Weston meter; 12 - DC generator; 13 - resistance

Card 3/3

L 17625-65 EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(j)/T/EWP(t)/EWP(b)/EWA(d) Pc-4/Pr-4/Pad/Ps-4/Pu-4 IJP(c)/ASD(m)-3 MJW/JD/WW/HW/JG/WB/RM

ACCESSION NR: AR4045030 S/0282/64/000/007/0035/0035

SOURCE: Ref. zh. Khimicheskoye i kholodil'noye mashinostroyeniye. Otd. vy*p., Abs.7.47.232

B

AUTHOR: Shvarts, G.L.

TITLE: Corrosion-resistant construction materials for fittings to be used in sulfuric and hydrochloric acid solutions

CITED SOURCE: Tr. Vses. n.-i. i konstrukt. in-t khim. mashinostr., vy*p. 45, 1963, 16-29

TOPIC TAGS: sulfuric acid medium, hydrochloric acid medium, fluorlon, polyethylene, titanium alloy, fluoroethylene, corrosion resistance, corrosion resistant fitting, nickel molybdenum alloy

TRANSLATION: The resistance to corrosion of over 20 different types of metallic and 10 non-metallic materials was studied. As a basic construction material for cast fittings for use in solutions containing free hydrochloric acid (to 2% at 90C) or sulfuric acid with concentrations of 10, 30 and 78% at temperatures up to 105C, the author recommends a nickel-molybdenum alloy containing not less than 26 - 30% molybdenum

Card 1/2

L 17625-65
ACCESSION NR: AR4045030

9

(alloy K65M28L). For cast fittings, for which the rate of metal loss (according to the conditions of their use) cannot exceed 0.1 mm per year (slide valves, bushings, gaskets, caps, etc.), a nickel-molybdenum alloy with a molybdenum content of 33-37% and an iron content of less than 6% (Alloy N60M35L) is recommended. For bellows-type thermostats, operated in hydrochloric acid solutions (to 2% and to the boiling point), the author proposes a titanium-base alloy containing 0.2% Pd. For such thermostats used in sulfuric acid solutions, not one of the existing metallic materials can be recommended. As test fittings it is suggested that bellows-type thermostats be used which are manufactured of OKh23N28M3D3T steel or NIMO alloy, protected by a fluoroethylene suspension. As lining materials for sulfuric acid and hydrochloric acid environments, the following are recommended: rubber No. 1001 and polyethylene obtained at low pressure; for packing - blue asbestos and fluorlon. For friction couples in sulfuric acid and hydrochloric acid media, it is proposed to use alloy N65M28 in the manner of alloy K65M28, covered with a suspension of fluoroethylene-40D. 5 illustrations. Bibliography with 6 references.

SUB CODE: MT, MM ENCL: 00

Card 2/2

L 15273-65 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pu-4 IJP(c)/ASD(m)-3 JD/JG

ACCESSION NR: AR4048474 S/0081/64/000/013/K001/K002

AUTHOR: Kamenskaya, Ye., A; Shvarts, G. L., Ivanov, Yu. M

TITLE: Corrosion resistance of titanium alloys

SOURCE: Ref. zh. Khimiya, Abs. 13K8

CITED SOURCE: Tr. Vses. n.-i. i konstrukt. in-t khim. mashinostr., vy*p. 45, 1963, 43-54

TOPIC TAGS: corrosion resistance, titanium alloy, hydrochloric acid, formic acid, oxalic acid, sulfuric acid, tantalum alloy, palladium alloy, niobium alloy, molybdenum alloy, copper alloy

ABSTRACT: Alloying Ti with a small quantity (0.1-0.2%) of palladium considerably increases its corrosion stability in HCl (concentrations up to 10%), and in boiling formic and oxalic acids (to 50%). Ti alloys with Ta (20% Ta) as well as with Nb (30% Nb) show satisfactory corrosion resistance to boiling solutions of HCl at low concentrations (to 5%) and to formic acid (to 50%). Alloying Ti with molybdenum (to 30%) increases the corrosion resistance in HCl (to 10%) and H_2SO_4. Alloying Ti with copper (1.5 and 5% Cu) increases its corrosion resistance in organic acids. All the experimental Ti-based alloys studied were unstable in 65-78% H_2SO_4 except for the alloy with 30% Mo, which gave inconsistent results. The alloys of Ti with Pd and Nb gave unsatisfactory results during work in friction pairs in 2% HCl and 65% H_2SO_4. Authors' summary

Card 1/2

L 15273-65
ACCESSION NR: AR4048474

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 2/2

L 10709-63 EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD
ACCESSION NR: AP3001648 S/0063/63/008/003/0283/0293 58

AUTHOR: Dyatlova, V. N.; Kristal', M. M.; Shvarts, G. L. (Cand. of technical sciences)

TITLE: Stainless steels as materials for chemical equipment

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 8, no. 3, 1963, 283-293

TOPIC TAGS: austenite-martensite stainless steels, Kh17N7Yu, Kh15N9Yu, Kh17N5M3, Kh15N8M2Yu, corrosion resistance of steels

ABSTRACT: Authors describe a new type of stainless steels which are high-strength, age-hardenable steels of the austenite-martensite class. Special feature of these steels is the ability of the martensite transformation to take place in them under the effect of low temperatures or cold plastic flow and increase in their strength during the subsequent aging process. American steels of this type, particularly those used in the aviation industry, are discussed briefly. Soviet steels of this type which are discussed include the Kh17N7Yu, Kh15N9Yu, Kh17N5M3, and Kh15N8M2Yu. Chemical composition and structure ags given in various tables and

Card 1/2

L 10709-63
ACCESSION NR: AP3001648

0

figures. Article then compares the corrosion resistance of these steels to 2Khl3, 1Khl8N9T and Khl7N2 steels. Comparative data is shown in tables. Article concludes by comparing the new steels with other types of steels with respect to mechanical properties, structure and corrosion resistance. Orig. art. has: 8 figures and 8 tables.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 015 OTHER: 007

ja/

Card 2/2

L 10711-63 EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD

ACCESSION NR: AP3001650 S/0063/63/008/003/0317/0328 54

AUTHOR: Shvarts, G. L. (Candidate of technical sciences); Shevelkin, B. N. (Candidate of technical sciences); Toropov, V. A. (Candidate of technical sciences)

TITLE: Titanium: a new material for chemical equipment

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 8, no. 3, 1963, 317-328

TOPIC TAGS: titanium, corrosion-resistance, chemical equipment

ABSTRACT: Authors present a detailed description of titanium and its application as one of the materials used for chemical equipment. The article contains descriptions of titanium and its chemical compositions, its mechanical and physical properties being manufactured in the SSSR and abroad and its best application as chemical equipment in different branches of the chemical industry. Titanium and its alloys at normal temperatures possess sufficient strength but are slightly less plastic than corrosion-resistant steels. The plasticity of titanium depends on the amount of the admixtures and alloying elements, the increase of which increases the strength and lowers the plastic properties of titanium. The most widely used

Card 1/2

L 10711-63
ACCESSION NR: AP3001650

titanium in the SSSR for chemical machine construction is the commercially pure titanium VT1, titanium alloy OT4-1 and OT4. Despite the high engineering properties and corrosion resistance of titanium and prospects of application in the construction of chemical equipment, the practical application is limited because of its high price. The only possible application at a lower cost of high-corrosion resistant chemical equipment is titanium (coated) steel. Orig. art. has: 6 figures and 8 tables.

ASSOCIATION: none

SUBMITTED: 000	DATE ACQ: 01Jul63	ENCL: 00
SUB CODE: 00	NO REF SOV: 007	OTHER: 012

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Card 2/2

L 39754-65 EWT(m)/EPF(c)/EWA(d)/EWP(j)/EWP(t)/EWP(z)/EWP(b) Pc-4
ACCESSION NR: AP4047508 MJW/JD/WB/RM S/0129/64/000/010/0032/0038

41
31
B

AUTHOR: Shvarts, G. L.; Akshentseva, A. P.; Istrina, Z. F.

TITLE: Microcorrosion of structural materials during the production of organic synthetic dyes

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1964, 32-38

TOPIC TAGS: aniline dye, maleic anhydride, selective corrosion, tail gas recovery, stainless steel, phthalic anhydride, weld joint, isatin, benzathrone, stress corrosion

ABSTRACT: Various types of stainless steel were investigated for the aniline dye industry. In maleic anhydride media, the weld metal of IKh18N9T (0.08C; 1.22 Mn; 0.50 Si; 17.03 Cr; 8.55 Ni; 0.60 Mn, 0.65 Ti), Kh18N12M2T (0.08 C; 0.69 Mn; 0.36 Si; 17.8 Cr; 13 Ni; 1.95 Mo; 0.44 Ti) and Kh18N12M3T (0.06 C; 0.76 Mn; 0.57 Si; 17.8 Cr; 14 Ni; 3.5 Mo; 0.41 Ti) specimens displayed a tendency to structural selective corrosion with respect to delta-ferrite. The weld joints of

Card 1/3

L 39754-65
ACCESSION NR: AP4047508

OKh23N28M3D3T (0.04 C; 0.53 Mn; 0.45 Si; 23.01 Cr; 28.15 Ni; 3 Mo: 0.50 Ti; 3.83% Cu) specimens having a pure austenitic structure were negligibly affected by general corrosion and those of pure VT-1-1 titanium were entirely corrosion resistant. In the media used in the wet recovery of tail gases for the production of phthalic anhydride, OKh21N5T (0.07 C; 0.99 Mn; 0.52 Si; 20.07 Cr; 5.39 Ni; 0.49% Ti) specimens and their welded joints were slightly affected by general corrosion although individual pitting occurred in the weld metal. Superficial pitting was observed in the weld joints of IKh18N9T specimens. Kh18N12M2T and OKh21N6M2T specimens which contain 1.95% and 2.08% Mo respectively were not affected by either general or pitting corrosion. During the separation of hydrochloric acid in the isatin production, pure VT1-1 Ti proved corrosion-resistant and OKh23N28M3D3T remained sound under the effects of sulfuric acid. During the production of 3-amino-5-sulfosalycilic acid Kh18N12M2T and OKh21N6M2T specimens were appreciably attacked by sulfuric acid, their weld metal having a two-phase structure. In the production of benzathrone, stress corrosion cracking appeared in OKh23N28M3D3T specimens after welding and other types of mechanical working. The steel is applicable provided finished parts are annealed at 950 C for 60 minutes and air cooled to relieve internal resi-

Card 2/3

L 39754-65
ACCESSION NR: AP4047508

dual stresses. Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: NIIKhIMMASh

SUBMITTED:00 ENCL: 00 SUB CODE: MM

NR REF SOV: 000 OTHER: 000

Card 3/3

L 26083-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) MJW/JD/WB

ACCESSION NR: AP4047510 S/0129/64/000/010/0044/0049

AUTHOR: Akshentseva, A.P.; Shvarts, G.L.; Krutikov, A.N.

TITLE: Heat treatment preventing the stress corrosion cracking of austenitic steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1964, 44-49

TOPIC TAGS: austenitic steel, steel corrosion, corrosion cracking, stress corrosion cracking, steel heat treatment, chloride ion, chlorate ion/steel Kh18N9T, steel Kh18N12M2T, steel Kh18N12M3T

ABSTRACT: The article presents the results of studies dealing with the prevention of stress corrosion cracking of Kh18N9T, Kh18N12M2T and Kh18N12M3T steel caused by the combined action of a corrosive medium and residual stresses in the metal. Corrosion tests under stress were made immediately after welding and also after various modes of heat treatment. The main corrosive medium was a boiling 42% solution of $MgCl_2$. Tests were also carried out in a boiling oxidizing medium containing $KClO_3$, $CaCl_2$ and KCl, and in an alkaline medium containing NaOH, Na_2CO_3 and NaCl at 200C. Samples of the above steels having residual tensile stresses were found, after various technological operations, to have a pronounced tendency toward transcrystalline stress corrosion cracking in the media containing the chloride ion. This tendency was also manifested

Card 1/2

L 26083-65

ACCESSION NR: AP4047510

in concentrated sodium hydroxide solutions at 200C. Stabilizing annealing at 900-920C with an exposure of 1-2 hrs. followed by cooling in air was found to prevent the cracking of samples after all the technological operations in tests with the 42% magnesium chloride solution and the concentrated NaOH solution at 200C. The above steels cannot be used in media containing chlorate ($KClO_3$) in addition to calcium ions and potassium chloride. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: NIIKhIMMASh

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000

Card 2/2

L 1677-66 EWT(m)/EPF(c)/EWA(d)/EWP(t)/EWP(z)/EWP(b) IJP(c) MJW/JD/HW/JG/WB

ACCESSION NR: AP5011357 UR/0365/65/001/002/0137/0149
620.193

AUTHOR: Shvarts, G. L.; Kristal', M. M.

TITLE: Metals and alloys for the chemical industry

SOURCE: Zashchita metallov, v. 1, no. 2, 1965, 137-149

TOPIC TAGS: corrosion resistant metal, alloy steel

ABSTRACT: About 200 types of carbon and alloyed steels as well as copper, nickel, aluminum, titanium, lead, and alloys based on these metals are presently being used in the chemical industry for equipment, machines and piping. The physical and chemical properties of some of these materials are described and recommendations are given for improving these properties. Comparative data on the corrosion resistance of various types of alloyed steels are given in table 1 of the Enclosure. Particular attention is given to Ni-Mo and Ni-Cr-Mo alloys. Data on the corrosion resistance of some of these alloys are given in table 2 of the Enclosure. Some consideration is given to the use of bimetals in order to economize on scarce materials such as titanium. Orig. art. has: 5 figures, 3 tables.

Card 1/5

L 1677-66

ACCESSION NR: AP5011357

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy i konstruktorskiy institut khimicheskogo mashinostroyeniya (All-Union Design Scientific Research Institute of Chemical Machinery)

SUBMITTED: 17Oct64 ENCL: 03 SUB CODE: MM, IE

NO REF SOV: 010 OTHER: 000

Card 2/5

L 1677-66
ACCESSION NR: AP5011357

ENCLOSURE: 01

Table 1

Medium	Concentration %	Temperature °C	Corrosion rate, mm/year Kh15N9Yu	Kh17N5M3	2Kh13	Kh18N10T
Nitric acid	10	40	0	0.001	0.007	0.001
		boiling	0.02	0.012	0.34	0.01
	30	20	0.000	0.000	0.000	0.000
		40	0.000	0.000	0.001	0.000
		boiling	0.11	0.10	1.68	0.03
	65	boiling	1.1	--	8	0.7
Phosphoric acid	20	boiling	0.03	0.01	2.6 *, †	0.004
	55	80	--	0.01	--	--
Magnesium chloride	42	135	0.01 *	0.01 *, †	0.03 †	0.04 §

*--point corrosion; †--corrosion cracking; §--pitting corrosion

Card 3/5

L 1677-66

ACCESSION NR: AP5011357 ENCLOSURE: 02

Table 2

Medium	Concentration %	Temperature	Corrosion rate, mm/year N70M27F (EP496)	Kh15N55M16V (EP375)	0kh23N28M3D3T (EI943)
Sulfuric acid	10	95°	0.106	0.274	0.071
		boiling	0.034	0.376	0.611
	20	95°	0.081	0.307	0.204
		boiling	0.027	0.966	2.32
	30	95°	0.081	0.344	0.45
		boiling	0.025	1.721	1.59
	40	95°	0.175	0.354	0.42
		boiling	0.033	4.100	1.10
	50	95°	0.106	0.417	0.37
		boiling	0.294	11.55	333.9
	65	95°	0.025	2.46	24.9
		boiling	4.18	78.35	52.8

Card 4/5

L 1677-66
ACCESSION NR: AP5011357

ENCLOSURE: 03

Medium	Concentration %	Temperature	Corrosion rate, mm/year N70M27F (EP496)	Kh15N55M16V (EP375)	Okh23N28M3D3T (EI943)
	78	95°	0.009	0.87	0.62
		boiling	15.9	12.8	9.0
	93	95°	0.02	0.17	0.22
		boiling	7.30	4.35	2.54
Hydrochloric acid	5	70°	0.19	0.42	--
		95°	--	2.37	--
		boiling	0.126	4.47	--
		70°	0.20	0.59	--
	10	95°	--	2.67	--
	15	boiling	0.27	--	--
	21	boiling	<0.5	--	--
Hydrofluoric acid	10	70°	0.18	0.23	--
		95°	0.91	1.17	--
	30	70°	0.75	0.80	--
		95°	1.67	0.92	--

Card 5/5

L 01806-66 EWT(d)/EWT(m)/EWP(i)/EWP(c)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWP(z)
EWP(b)/EWP(l)/EWA(c)/ETC(m) IJP(c) WW/WJW/JD/HW/JG/WJW(CL)
ACCESSION NR: AP5020697 UR/0314/65/000/008/0005/0008

AUTHOR: Shvarts, G. L., (Candidate of technical sciences); Kristal', M. M., (Candidate of technical sciences); Dyatlova, V. N., (Engineer)

TITLE: New structural material for chemical machine building

SOURCE: Khimicheskoye i neftyanoye mashinostroyeniye, no. 8, 1965, 5-8

TOPIC TAGS: structure material, chemical equipment material, steel, corrosion resistant steel, alloy, corrosion resistant alloy/ 000Kh18N10 steel, 0K17N16M3T steel, Kh15N9Yu steel, Kh16N6 steel, Kh17N5M3 steel

ABSTRACT: In connection with increasing demands of the chemical industry, several new materials have been suggested for use in chemical equipment. Low-carbon 18-8-type steel 00Kh18N10 (0.04% max carbon) has been added to GOST 5632-61. 000Kh18N10 steel (0.03% max carbon) has been made available in sheet and plate form. The latter steel is much more corrosion resistant than standard Kh18N10T steel and its welds are not susceptible to knife-line attack. For parts operating in nitric acid and urea the fully austenitic steel EI580 with 0.06% max carbon is recommended. For service in sulfuric and

Card 1/3

L 01806-66

ACCESSION NR: AP5020697

hydrochloric acid solutions with low or medium concentration, the new nickel-molybdenum alloys N70M27F and Kh15N55M16V have been developed. Welds of Kh15N55M16V alloy are susceptible to knife-line attack, but an attempt has been made to eliminate this susceptibility by decreasing the silicon content. The precipitation-hardenable austenic-martensitic steels Kh15N9Yu, Kh16N6, and Kh17N5M3, which combine high strength with a satisfactory corrosion resistance, have been used under conditions where no other stainless steels could be used. Titanium has been extensively used in numerous applications, especially where chlorine is involved. Certain economic advantages are offered by the use of clad metals, such as carbon steels clad with Kh18N10T, Kh17N13M2T, and OKhN28M3D3T steel, or with nickel, copper, or silver. The clad steels have the same resistance to intergranular corrosion as solid stainless steels, and their resistance to stress corrosion is even higher. To have a satisfactory corrosion resistance the metal and its welded joints should contain not more than 0.03% carbon. Orig. art. has: 3 figures. [ND]

ASSOCIATION: none

Card 2/3

L 01806-66

ACCESSION NR: AP5020697

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, GC

NO REF SOV: 003 OTHER: 001 ATD PRESS: 4085

Card 2/3

L 24729-66 EWT(d)/EWT(m)/EWP(c)/EWA(d)/EWP(v)/EWP(t)/EWP(k)/EWP(h)/EWP(l)/ETC(m)-6

ACC NR: AP6015856 SOURCE CODE: UR/0314/65/000/008/0005/0008

IJP(c) JD

AUTHOR: Shvarts, G. L. (Candidate of technical sciences); Kristal', M. M. (Candidate of technical sciences); Dyatlova, V. N. (Engineer)

ORG: none

TITLE: New structural materials for chemical machine building

SOURCE: Khimicheskoye i neftyanoye mashinostroyeniye, no. 8, 1965, 5-8

TOPIC TAGS: low alloy steel, corrosion resistance, titanium, stainless steel, steel, annealing, sheet metal, corrosion rate, alloy, dispersion hardening, ferritic steel, austenitic steel, martirsitic steel, titanium alloy, solid solution/09G2S low alloy steel, 16GS low alloy steel, St 3 steel, 00Kh18N10 stainless steel, Kh18N10T steel, 0Kh17N16M3T steel, N70M27F alloy, Kh15N55M16V alloy, Kh15N9Yu steel, Kh16N6 steel, Kh17N5M3 steel, VT1-1 titanium, OT4 titanium alloy

ABSTRACT: In recent years the low-alloy steels 09G2S and 16GS have begun to be used to make chemical apparatus in addition to the usual quality steels. In comparison with steel St. 3, these steels are characterized by increased strength (15-20%) and by a wide operating temperature range (-40 to +420°C).

An effective method of increasing corrosion resistance in nitric acid and in other corrosive media is to decrease the carbon content to 0.03% or less. Presently, stainless steel grade 00Kh18N10 containing up to 0.04% is being put into GOST 5632-61. Production is starting on sheet steel grade 00Kh18N10 containing less than 0.03% C. Studies have indicated that the corrosion

Card 1/3 UDC: 669.018.9:66.02.001.8

resistance of steel containing less than 0.03% C, after annealing and subsequent heat at 650 C for 1 hour in fuming 65% nitric acid, is 0.25 mm/year whereas steel Kh18N10T containing 0.08% C it is 2 mm/year.
The production of steel OKh17N16M3T (EI580) containing less than 0.06% C has started. This steel has a pure austenitic structure.

Alloy N70M27F is recommended for joining large-size weldments when the thickness of the weld metal is less than 5 mm, on the basis of the studies conducted at NIIkhimmash together with TsNIIChM. The corrosion rate of this alloy in hydrochloric acid in 1-37% concentrations at 20 and 70°C and in boiling solutions containing up to 10% HCl does not exceed 0.2 mm/year, and in the 15-21% concentration range it amounts to less than 0.5 mm/year. In sulfuric acid the alloy is stable under the following conditions: at 20 and 70°C in the 10-83% concentration range; at 95°C in the 10-30 and 50-93% concentration ranges, at boiling temperature in the 10-40% concentration range (rate of corrosion does not exceed 0.1 mm/year). Alloy N70M27F is stable in phosphoric acid at 77-115% concentrations and up to 140-200°C (in relation to the acid concentration).

The Ni-Cr-Mo alloy Kh15N55M16V is sufficiently stable in sulfuric acid in all concentrations at 70°C and in the 10-55 and 78-93% ranges at 95°C and in boiling sulfuric acid up to 10% concentration (rate of corrosion is 0.1-0.5 mm/year). In concentrations above 10% the alloy is unstable in boiling sulfuric acid.

L 24729-66

ACC NR: AP6015856

A need for materials combining high corrosion resistance and strength led to the introduction of dispersion hardened steels Kh15N9Yu, Kh16N6, and Kh17N5M3 of the austenitic-martensitic class as well as of steels of the austenitic-ferritic class for chemical machine building. The corrosion rate of steels Kh15N9Yu and Kh16N6 in 65% fuming nitric acid is 1.6 mm/year and 1.54 mm/year respectively.

A deficiency of austenitic-ferritic class steels is their tendency, higher than in austenitic steels, to selective structural corrosion in media containing the chlorine ion, sulfuric acid and maleic acid.

Of the various grades of titanium produced domestically technically pure titanium VT1-1 and low-alloy titanium alloy OT4 are used in chemical equipment building.

The corrosion resistance of titanium in a number of corrosive media can be improved by alloying it with other elements forming solid solutions with titanium. Workers at the Institute of Physical Chemistry AN USSR and NIIkhimmash, together with the State Institute of Rare Metals, established that in solutions of hydrochloric acid an alloy of titanium and 0.2% Pd has a considerably lower corrosion rate than titanium; it is stable in 30% HCl at room temperature, in 10% HCl at 90°C, and in 5% HCl at boiling temperature. Orig. art. has: 3 figures. [JPRS]

SUB CODE: 13, 11, 20 / SUBM DATE: none / ORIG REF: 003 / OTH REF: 001

Card 3/3 MJS

ACC NR: AP7005517 SOURCE CODE: UR/0314/66/000/011/0029/0030

AUTHORS: Shvarts, G. L. (Candidate of technical sciences); Belaya, O. I.; Maragayeva, V. N.

ORG: none

TITLE: Stability of structural materials in sodium chlorite solutions

SOURCE: Khimicheskoye i neftyanoye mashinostroyeniye, no. 11, 1966, 29-30

TOPIC TAGS: sodium compound, chlorine compound, steel, steel alloy, corrosion rate, corrosion, WOOD CHEMICAL PRODUCT, PLASTIC

ABSTRACT: The stability of the following materials in acid sodium chlorite solutions was investigated: technical titanium, steels Kh18N12M2T, OKh23N28M3D3T, alloys N70M27(EI639), Kh15N55M16V(EP375), and a number of plastics, wood composition materials, and rubbers 1001, 1225, 1256, 4476, 4990, 6298-1, 6253, and 8-LTI. The corrosion experiments were carried out at pH 3.6--5 and at temperatures of 80--85C, over a period of 120 hours. It was found that the most stable metallic specimens were: technical titanium, alloy OT4, and steel Kh15N55M16V, in that order, and the most stable nonmetallic specimens were fluoroplast-4, plastic PKhV, and vinyl plastic. N. A. Oskorbina and V. P. Samarina took part in the experiments at the Central Scientific Research Institute for Linen Fibers (Tsentral'nyy nauchno-issledovatel'skiy institut l'nyanykh volokon).

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SO: Sum. No. 480, 9 May 55

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Akademiya nauk SSSR. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, tom 6 (Investigations of Heat-Resistant Alloys, Vol. 6) Moscow, 1960. 319 p. Errata slip inserted. 3,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni A. A. Baykova. Nauchnyy sovet po probleme zharoprochnykh splavov.

Editorial Board: I. P. Bardin (Deceased) Academician, G. V. Kurdyumov, N. V. Ageyev, Corresponding Member, Academy of Sciences USSR (Resp. Ed.), I. A. Oding, I. M. Pavlov, and I. F. Zudin, Candidate of Technical Sciences; Ed. of Publishing House: V. A. Klimov; Tech. Ed.: S. G. Tikhomirova.

PURPOSE: This book is intended for research workers in the field of physics of metals and for metallurgists, particularly those working on heat-resistant alloys.

COVERAGE: This collection of 45 articles deals with various problems in the production of heat-resistant alloys. Special attention is paid to the mechanisms of deformation of such metals as aluminum, copper, iron, and nickel. Various defects and failures of metals are analyzed, and means for increasing the heat resistance and plasticity are described. Among the special problems discussed are: electrolytic conductivity of iron-aluminum alloys in the solid state; the mobility of atoms in nickel-iron alloys, depending upon defects of their crystalline structure; the kinetics of change in isolated pores; the irreversible thermal transformation of solid bodies, etc. No personalities are mentioned. References follow each article.

Ginzburg, E.S., R.A. Lipshteyn, and S.E. Khaykina. Resistance of the Metal of Gas Turbines Against Vanadium Corrosion When Sulfurous Mazuts Are Used as Fuel 140

Matysina, Z.A., and A.A. Smirnov. Ordering of Alloys With Hexagonal Compact Crystalline Lattice 146

Galiskov, V.S., A.N. Orlov, and I.A. Shvarts. Autoradiographic Detection of Adsorption Heterogeneities of Concentration 158

Korsunskiy, M.I., and Ya.Ye. Genkin. Feasibility of Determining the Distribution of Electrons According to the States $d_{3/2}$ and $d_{5/2}$ From the Ratio of the Intensities of L-Series Lines 163

Korsunskiy, M.I., and Ya.Ye. Genkin. X-ray L-spectra of Niobium in Diboride, Nitride, and Carbide of Niobium, and the Character of Bonds of These Compounds 169

Mal'shin, M.Ya. Kinetics of Changes in Isolated Pores 174

Kolomytsev, P.T. Interaction of Boron With Chromium in Ternary Nickel-Base Alloys 180

Banyth, O.A., and I.F. Zudin. Some Regularity Patterns in the Formation of σ-Phase in Steel With 18% Cr and 14% Mn 187

Levin, Ye.Ye., and Ye.N. Pirnik. Maximum Structural Stabilization as a Means for Increasing the Durable Heat-Resistance and Plasticity of Alloys 195

Arzhanyy, P.M., R.M. Volkova, and D.A. Prokoshkin. Investigation of the Structure and the Phase State of a Diffusion Silicon Coating of Niobium 201

Sheptal, R.I. Resonance Method for Determining the Internal Friction in Metals 207

Danil'chenko, A.F., M.V. Mazlegarov, V.Ya. Mazis, M.Ya. Daugutov, and Yu.V. Vinogradov. Effect of Pressure Treatment on the Endurance and Plasticity of Alloys 211

Kusatkin, B.S. The Nature of the "White Strip" in Welds of Heat-Resistant Perlitic Steels 223

Savitskiy, V.G., and K.V. Popov. Simultaneous Occurrence of Cold Shortness and "Anticold Shortness" (Condition opposite to cold shortness) 227

Yagunova, T.A., K.V. Popov, and E.P. Zhidanova. Effect of the Chromium Content on the Rate of Diffusion and Solubility of Hydrogen in Iron-Chromium Alloys 231

Svechnikov, V.N., G.P. Kobzenko, and Yu.A. Kocherzhinskiy. Investigation of Transformations in Chromium During Heating and Cooling by the Method of Differential Thermal Analysis 238

Svechnikov, V.N., and V.M. Pan. Investigation of the Ternary System Chromium-Nickel-Niobium 240

Gertsriken, S.D., I.Ya. Dekhtyar, L.M. Kumok, and N.G. Nakhimova. Investigation of Defects of Crystalline Structure in Chromium 251

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AUTHORS: El'kin, I., Zelikovskiy, I., ~~Shwarts, I.~~ SHVARTS, I., Engineers

TITLE: Tensiometric Pressure Pickups for Hermetically Sealed Refrigerating Compressors

PERIODICAL: Kholodil'naya tekhnika, 1960, No. 6, pp. 18-21

TEXT: The laboratory of KhOKB and KhZTM has been engaged in developing pressure pickups and measuring devices for pressure indication in hermetically sealed refrigerator compressors. One of the basic elements of the pressure indicator, the working principle of which is briefly described, is the pressure pickup. Its sensitive element is a membrane, whose deformations are brought about by the glued-on wire tensiometer. The size of the membrane and the arrangement of the wire tensiometers are shown on Figure 1. Care must be taken that the deformations of the membrane due to pressure are not interfered with by deformations caused by temperature changes. By way of experiments it has been found that the best results are obtained with tape membranes of 10 mm in diameter and 0.25 mm thick or 15 mm x 0.3 mm or 19 mm x 0.4 mm. Property changes taking place in the glue due to tempera-

Card 1/4

S/066/60/000/006/005/009
A053/A029

Tensiometric Pressure Pickups for Hermetically Sealed Refrigerating Compressors

ture fluctuations are also to be considered. The design described provides for glue БФ-2 (BF-2). It the strain gage operates at 90 - 100°C, the polymerization of the glue should be conducted at 160 - 175°C. The indications of the pressure indicator fitted with a pickup which complies with above requirements are practically free from temperature interference. The amplitude characteristics of the pickup depend also on the arrangement of the wire-type tensiometers, of which one is the working tensiometer and the other the thermo-compensational tensiometer. Both tensiometers must be fastened to parts having the same coefficient of linear expansion and be located in a zone of equal temperature, which is the case as illustrated on diagram I: the working tensiometer is glued to the membrane in the center, the compensational tensiometer is parallel to the working tensiometer at the edge of the membrane. Both tensiometers are located in the cavity of the cylinder within reach of the hot Freon gases and oil. Another arragement of the tensiometers is shown under II: the working tensiometer is fastened in the center of the membrane and the thermo-compensational tensiometer radially at